JUNIOR HIGH AGRICULTURE: LAND AND LIFE

PROGRAM OF STUDIES

This program of studies for the Junior High Agriculture: Land and Life Program has been approved for use in classrooms during the 1988-89 school year. However, provincial implementation is scheduled for September 1989.

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A. PROGRAM RATIONALE AND PHILOSOPHY

"The aim of education is to develop the knowledge, the skills and the positive attitudes of individuals, so that they will be self-confident, capable and committed to setting goals, making informed choices and acting in ways that will improve their own lives and the life of the community."

Secondary Education in Alberta,
June 1985

The Junior High Agriculture: Land and Life Program provides a three-year sequence of complementary courses in support of the aim of education stated above. The program is designed to provide students with a broad awareness of the economic, social and scientific realities of the agricultural enterprise. Learnings are introduced in meaningful contexts, through hands-on activity, through experimentation and through examination of current agricultural practices. The program offers students the opportunity to explore personal interests as well as to broaden their understandings of the world in which they live.

The program is designed to be of interest to all students in the province, whether they be of urban or rural backgrounds. Examples and emphasis within the program provide for a balance of perspectives, including those of the consumer and the home gardener as well as the producer and worker in agricultural businesses. The emphasis of the program is thus on awareness, insights and understanding of agriculture rather than on specific vocational knowledge and skills.

B. GOALS AND OBJECTIVES

GOALS

- To develop an awareness of the diversity of agricultural activity in students' local areas, in Alberta, and in the national and international community.
- To develop critical thinking and problem-solving skills in the process of examining agricultural problems and practices.
- To acquire knowledge of the factors of agricultural production and processing.
- To recognize relationships between producers, processors, marketers and consumers.
- To appreciate agriculture for its economic significance, career opportunities and its impact on quality of life.
- To acquire knowledge and develop skills applicable to plant and animal care in both urban and rural settings.
- To develop a resource management perspective, recognizing areas where personal and public decision making are needed.
- To acquire an awareness of agricultural technologies, including examination of emerging technologies as well as those of the past and present.
- To develop an awareness of societal issues and concerns that are agriculture related.
- To develop an awareness of the scope of agriculture in urban areas.

OBJECTIVES

Specific concept, skill and attitude objectives are identified for each theme in the statement of content which follows.

C. CONTENT

THEMES OF THE JUNIOR HIGH AGRICULTURE: LAND AND LIFE PROGRAM

The Junior High Agriculture: Land and Life Program is a sequential three-year complementary course of studies for Grades 7, 8 and 9. In each year of the program, the following three themes are to be developed:

THEME 1: Production, Processing and Marketing

Theme 1 units provide an opportunity for students to study a sample area of agricultural production using a case study approach. The units examine activities of producers, processors, marketers and consumers, highlighting roles and interrelationships of agricultural activity at each stage. The intent is to provide insight into all aspects of a particular segment of the agriculture industry.

SURVEY: What is Agriculture?

This unit provides a survey of agricultural activity at the local, provincial, national and international levels. The intent of the unit is to expand students' knowledge of the scope of agriculture and to help students recognize the impact of agriculture on society.

THEME 2: Technology and Research

Theme 2 units examine a technology that supports effective agricultural practice. Practical problems in production or processing are considered. In each unit students explore alternative approaches to problem solution, in many cases through hands-on activities. Activities promote an understanding of the role of research and innovation in ensuring the success of agricultural practice.

THEME 3: Resource Management

Theme 3 units examine the management of the key resources – water, soil and land use – in ways that consider environmental and social impacts as well as effects on agricultural production. The concepts of sustained yield, monitoring and environmental management are central to this unit.

Flexibility is provided in the selection of particular topics to develop the themes. To provide guidance in selecting and organizing content, an example has been developed for each theme at each level. Within the required themes, the approach to topic development is generally through a case study. Using this approach, students have the opportunity to learn important ideas and principles through a focus on a meaningful example.

The program has been designed for 75 hours of instructional time for the required and elective component for each year of the program. Each thematic unit represents a minimum of 12 hours of instruction. Please note that **SURVEY: What is Agriculture?** is also designed for a minimum of 12 hours of instruction.

OPTIONAL UNITS

Teachers may complete the program by offering a number of optional units selected from the list below. These units provide opportunities for students to pursue areas of interest. Optional units may also serve to provide added focus on local agricultural practices or to broaden students' understanding of agriculture. A minimum of six hours instructional time is recommended for each optional unit.

At each level of the program, students may also study a local interest topic not included in the following list.

Agriculture and Human History
Agricultural Horizons: An Examination of Agriculture Around the World
Agricultural Services
Animal Care
Beekeeping
Cattle
Computers and Agriculture
Crop Protection
Farming and Wildlife
Forage Crop Production
Fruit Crops
Fur Farming
Hogs
Home Gardening and Food Production
Import and Exports
Horses
Indoor Gardening
Irrigation
Landscape and Trees
Marketing and Advertising
Market Gardening
Marketing Systems
Mushroom Farming
Oilseed (Canola)
Planning and Finances: The Business Side of Farming
Poultry
Processing and Preserving
Research and Technologies
Sheep and Goats
Sugar
Transportation
Trapping
Tree Farming
Weather and Crop Management

SCOPE AND SEQUENCE

The program content is organized in a way that provides for themes to be developed over a three-year program sequence. Entry points to the program may be at any of the three levels, but where possible it is recommended that students enter the sequence at the year one level.

THEME	YEAR ONE UNITS	YEAR TWO UNITS	YEAR THREE UNITS
THEME 1: Production, Processing and Marketing	*Production, Processing and Marketing Case Study* Emphasis on consumer perspective	*Production, Processing and Marketing Case Study* Emphasis on nutrition	*Production, Processing and Marketing Case Study* Emphasis on energy
SURVEY: What is Agriculture?	*What is Agriculture?*	*(*What is Agriculture?)*	*(*What is Agriculture?)*
THEME 2: Technology and Research	*Mechanical Technology Case Study*	*Technology for Planning, Monitoring and Managing Case Study*	*Biotechnology Case Study*
THEME 3: Resource Management	*Water*	*Soil*	*Land Use*
OPTIONAL UNITS	Optional Unit(s) as Selected	Optional Unit(s) as Selected	Optional Unit(s) as Selected

*For students entering the program at the year two or three level, it is recommended that the unit **SURVEY: What is Agriculture?** be included as part of their first year in the program. Note that this survey unit should follow the Theme 1 unit in order that key ideas and skills from the Theme 1 case study can be utilized.

THEME 1: Production, Processing and Marketing Case Study

Overview

This unit uses a case study approach. The intent of the unit is to provide a practical examination of production, processing and marketing through the direct study of a particular agriculture industry. The dairy industry has been chosen to illustrate the development of the case study, but the approach followed here may be adapted to any other agriculture related industry. Emphasis is to be placed on consumer perspective (i.e., food needs and preferences) and its influence on the agriculture industry. In keeping with this consumer perspective, it is suggested that the unit be approached first by examining local food products in relation to consumer needs and preferences. The stages leading up to the final product can then be traced in relation to this initial perspective on the industry.

Opportunities are provided within the unit for students to become involved in activities that are realistic examples of activities within agricultural industries. In particular, students will have opportunities to take initiatives in the design and development of consumer surveys, in the preparation of a sample product, and in the design of a sample marketing strategy.

Objectives

Concepts

Students will develop an understanding of each of the following concepts:

- consumption
- consumer needs and preferences
- products
- merchandising
- processing and packaging
- production (farm operations)
- transportation and storage
- career specializations and expertise
- local, provincial and national production.

Skills

Students will acquire skills in:

- monitoring personal consumption
- assessing consumer needs and preferences
- classifying products
- identifying steps in processing and packaging
- examining role of consumer preferences in determining products
- designing and evaluating approaches to marketing.

Attitudes

Students will develop the following attitudes:

- awareness of the complex and multifaceted nature of an agricultural production industry
- appreciation of the consumer-producer relationship
- appreciation of the role of technologies in agricultural production, processing and marketing
- awareness and appreciation of opportunities for careers in agriculture related industry.

Example Topic: Milk Products

SURVEY: What is Agriculture?

Overview

This required unit should be offered to students within the first year of their program. The intent of the unit is to provide a comprehensive overview of agricultural activity, providing students with a sense of its diversity and scope. The perspective adopted within this unit is that agricultural activity involves much more than the rural farm, and that the impact of agriculture pervades all of society. The unit examines agriculture at a variety of levels from local to global and introduces students to Alberta's role as both an importer and an exporter of agricultural commodities.

This survey unit should follow the Theme 1 unit as many of the key ideas and skills can be drawn from the Theme 1 case study.

Objectives

Concepts

Students will develop an understanding of each of the following concepts:

- diversity of agricultural operations
- components of agricultural industries: production, processing and marketing
- roles and careers
- agriculture as both producer of products and consumer of goods and services
- historical trends
  - increasing productivity per farmer
  - increasing productivity per unit area of land
  - degradation of farmland in areas of long-term inappropriate land use practices
- local, provincial, national and international food production
- transportation and trade of food products.

Skills

Students will acquire skills in:

- classifying and sequencing steps in the production, processing, marketing and distribution of agricultural products
- interpreting maps and charts
- identifying factors that support or inhibit food production in different areas of the world
- identifying issues in global agricultural production.

Attitudes

Students will develop the following attitudes:

- appreciation of the complex food production, processing and distribution system that exists to meet all our local food needs
- awareness of the diversity of agriculture related activities and occupations
- appreciation of the international nature of food production and distribution
- concern regarding problems in worldwide food production and distribution.

THEME 2: Technology and Research: Mechanical Technology Case Study

Overview

In this case study, students consider practical problems that have faced farmers and food processors since the earliest times: how to plant, harvest and mill grain, and how to do these things in a way that is both efficient and effective. First, the development of techniques and specialized equipment is presented as a form of problem solving where the need for the technology exists, then the inventions and new techniques follow. Students are presented with the problems, then consider both their own ideas and the technologies that have been specifically developed to solve these problems. By tracing the historical development of agricultural equipment, students are able to understand and appreciate the significance of improvements through the years.

Note that although grain technology has been used as an example for this case study, the objectives for the unit can be achieved through the study of any food production or processing industry.

Objectives

Concepts

Students will develop an understanding of each of the following concepts:

- physical work inherent in agriculture
- specific tasks to be performed in producing a particular agricultural product (tasks and subtasks)
- manual and mechanical approaches to production
- power sources: manual, animal, fuels, electrical sources
- technology as a means of problem solving (finding effective and efficient ways to get a job done)
- effectiveness of technologies
- efficiency of technologies
  - efficiency in use of human time and energy
  - efficiency in use of land
  - efficiency in use of other resources
- safety in use of technologies: safety equipment and procedures
- use of alternative technologies; e.g., zero tillage versus intensive cultivation.

Skills

Students will acquire skills in:

- identifying and analyzing sequences of tasks to be performed
- identifying alternative creative thinking approaches to solving a practical problem
- drawing and designing devices to perform given tasks
- constructing models of equipment.

Attitudes

Students will develop the following attitudes:

- appreciation of the human energy and expertise that go into agricultural production
- awareness of human progress in applying technology to agricultural production
- awareness of self as a problem solver
- awareness of the effect of agricultural technology on the overall quality of life
- awareness and appreciation of opportunities for careers in agriculture related industry
- awareness of dangers in working with power equipment
- responsibility regarding personal and group safety in using equipment.

Example Topic: Grain Production and Processing Technology

THEME 3: Resource Management: Water

Overview

Water is a critical resource to agriculture. In many areas the supply of water is the limiting factor that determines what crop can be successfully grown, and in all areas it influences the size and quality of the crop. The study of water within an agriculture unit thus focuses on the natural supply of water within the province and how that supply can be managed for effective agricultural use.

Objectives

Concepts

Students will develop an understanding of each of the following concepts:

- water needs
- water resources
- landforms and water supply
- variation in water supply
- agricultural water use and management
  - surface moisture
  - ground water
  - conservation practices
  - irrigation and drainage
- water rights
- water issues.

Skills

Students will acquire skills in:

- interpreting charts and maps
- identifying relationships between water supply and topography
- generating alternatives regarding ways to meet water needs
- evaluating strategies for water management
- identifying trade-offs in water uses
- identifying land use practices that affect available water.

Attitudes

Students will develop the following attitudes:

- awareness of the importance of water resources
- awareness of the impact of water shortages and surpluses (economic and social impacts)
- awareness and appreciation of water as a limited resource
- conservation ethic
- awareness and appreciation of opportunities for careers in water management.

YEAR TWO PROGRAM

THEME 1: Production, Processing and Marketing Case Study

Overview

This unit adopts a case study approach. The intent of the unit is to provide a practical examination of production, processing and marketing through the direct study of a particular agricultural industry. The meat processing and production industry has been chosen to illustrate the development of the case study, but the approach followed here may be adapted to any other agriculture related industry.

Overall, the unit follows a similar format to that of the first unit in the Year One Program, but its main focus is the nutritional value of the products rather than consumer preferences. The unit will thus consider dietary needs as well as the relative nutritional value of various food products prepared in a variety of forms.

Objectives

Concepts

Students will develop an understanding of each of the following concepts:

- nutrition (review)
- nutrient composition of foods (focus on proteins)
- consumer needs versus consumer preferences
- products
- merchandising
- processing and packaging
- production (farm operations)
- breed development as a means of increasing quantity and quality of product
- transportation and storage
- local production as a component of provincial, national and international production.

Skills

Students will acquire skills in:

- monitoring personal consumption by nutrient groups
- assessing consumption in relation to nutritional needs
- identifying and classifying products
- comparing alternative sources of nutrient needs
- analyzing steps in production, processing and packaging
- analyzing role of consumer preferences in determining products and packaging.

Attitudes

Students will develop the following attitudes:

- awareness of the importance of diet to human growth, development and continuing function of a healthy body
- awareness of the complex and multifaceted nature of a food production industry
- appreciation of the consumer–producer relationship
- appreciation of the role of technologies in the production and processing of food
- awareness and appreciation of opportunities for careers in agriculture related industry.

Example Topic: Meat Products

SURVEY: What is Agriculture?

Note: This unit is to be offered here only if students are entering the course at year two.

Overview

This required unit should be offered to students within the first year of their program. The intent of the unit is to provide a comprehensive overview of agricultural activity, providing students with a sense of its diversity and scope. The perspective adopted within this unit is that agricultural activity involves much more than the rural farm, and that the impact of agriculture pervades all of society. The unit examines agriculture at a variety of levels from local to global and introduces students to Alberta's role as both an importer and an exporter of agricultural commodities.

This survey unit should follow the Theme 1 unit as many of the key ideas and skills can be drawn from the Theme 1 case study.

Objectives

Note: See Year One Program (page 7) for listing of concepts, skills and attitudes.

THEME 2: Technology and Research: Technology for Planning, Monitoring and Managing Case Study

Overview

The process of farm production can be viewed as a series of planned interventions that will enhance the development of a particular food crop. For every action that the farm operator takes, there is usually a best time to do it and generally a most effective way. The decisions of when to plant, how deeply, when to provide fertilizers, supplements or special treatments, and what other conditions should be modified are all dependent on a wide range of changing conditions, each of which needs to be monitored if appropriate action is to be taken.

Intensive agricultural production requires an increasingly high level of planning, monitoring and management. Greenhouse production, the raising of specialized animal breeds and the use of integrated pest management are all examples of such intensive production processes.

Note: Several of the activities will be most successful if preparations are made well in advance. It is suggested that the unit be planned in a way that allows activities to take place over several months, overlapping one activity with another as required. Teaching the unit in conjunction with another unit may be considered.

Objectives

Concepts

Students will develop an understanding of each of the following concepts:

- environments
  - environmental factors
  - natural environments
  - artificial environments
  - micro environments
- competition for nutrients, water and light
- plant cycles
- pest and disease management
- control systems
- optimum conditions for plant growth.

Skills

Students will acquire skills in:

- monitoring plant growth and plant health
- measuring soil moisture and humidity
- applying techniques for plant propagation: planting seeds and bulbs, making cuttings
- preparing a "growth chamber" to meet the needs of a particular plant
- identifying variables that affect plant growth
- creative and critical thinking regarding alternative ways to meet plant needs
- maintaining a record of plant treatments and plant growth
- identifying greenhouse pests and weeds.

Attitudes

Students will develop the following attitudes:

- appreciation of the human energy and expertise that go into agricultural production
- appreciation of the complexity of plant care in controlled environmental conditions
- awareness of self as problem solver
- appreciation of the need for accuracy and precision in the monitoring and managing of living things
- awareness of career opportunities in plant care and plant research
- responsibility regarding personal and group safety in the selection and use of pest controls.

Example Topic: Greenhouse Management

THEME 3: Resource Management: Soil

Overview

Soil is a basic agricultural resource. The quality of soil is a major determiner of the success of agricultural production; its loss or degradation is thus of major concern. This unit examines the characteristics of soil that determine its overall quality and considers problems in soil management.

Objectives

Concepts

Students will develop an understanding of each of the following concepts:

- soil functions
- soil characteristics
  - composition
  - soil nutrients/essential minerals
  - porosity
  - acidity/alkalinity
- soil development
- nutrient cycles
- soil degradation
  - erosional losses
  - nutrient losses: leaching
  - salinization, alkalization and acidification
- soil management
  - soil assessment
  - tillage
  - chemical treatments/recycling of nutrients
- fertilizing: organic and inorganic nutrients
- worldwide soil problems
  - loss of arable land through erosion
  - loss of land through urbanization and transportation corridors
- soil management for household gardening.

Skills

Students will acquire skills in:

- classifying soil components
- describing soil types
- measuring mineral content of soil
- measuring pH of soil
- identifying appropriate measures for preventing erosion in given situations
- identifying and describing problems in soil management
- identifying alternatives in soil management
- growing plants without soil.

Attitudes

Students will develop the following attitudes:

- awareness of the importance of soil resources
- awareness of the effect of land use decisions on soil retention and soil characteristics
- awareness and appreciation of soil as a limited resource
- conservation ethic
- awareness and appreciation of opportunities for careers in soil science and soil management.

YEAR THREE PROGRAM

THEME 1: Production, Processing and Marketing Case Study

Overview

This unit follows a case study approach. The intent of the unit is to provide a comparative study of two or more agriculture industries, examining energy and resource inputs in relation to food production. The key idea of the unit is that different forms of agricultural production and processing each have implications for the amount of energy and other resources required. The energy used in food production contributes in various ways to the final energy of the food product, but this food energy is generally small in relation to the large energy expenditure involved in its production and processing.

The outlines provided for this case study compare the production of vegetable crops for direct human consumption and the production of meat through raising forage crops. The approach followed here may be adapted to other agricultural products, but the main focus should be on the efficiency of production.

Objectives

Concepts

Students will develop an understanding of each of the following concepts:

- range of food crops
- consumption
- consumer needs and preferences
- products
- merchandising
- processing and packaging
- production (farm operations)
- transportation and storage
- inherent and invested energy
- food pyramid
- local production as a component of provincial, national and international production.

Skills

Students will acquire skills in:

- assessing consumer needs and preferences
- assessing energy content of food
- comparing and classifying products
- analyzing steps in processing and packaging
- identifying steps in which invested energy is added
- identifying role of consumer preferences in determining products and packaging.

Attitudes

Students will develop the following attitudes:

- awareness of the complex and multifaceted nature of a food production industry
- awareness of the role of energy in food production
- appreciation of the consumer-producer relationship
- appreciation of the role of technologies in the production and processing of food
- awareness and appreciation of opportunities for careers in agriculture related industry.

Example Topic: Field Crops: Food and Forage

SURVEY: What is Agriculture?

Note: This unit is to be offered here only if students are entering the course at year three.

Overview

This required unit should be offered to students within the first year of their program. The intent of the unit is to provide a comprehensive overview of agricultural activity, providing students with a sense of its diversity and scope. The perspective adopted within this unit is that agricultural activity involves much more than the rural farm and that the impact of agriculture pervades all of society. The unit examines agriculture at a variety of levels from local to global and introduces students to Alberta's role as both an importer and an exporter of agricultural commodities.

This survey unit should follow the Theme 1 unit as many of the key ideas and skills can be drawn from the Theme 1 case study.

Objectives

Note: See Year One Program (page 7) for listing of concepts, skills and attitudes.

THEME 2: Technology and Research: Biotechnology Case Study

Overview

The production of high quality animal and plant products requires genetic strains that respond well to the conditions of production. In part, this is a matter of efficiency: only those breeds that can make the most effective use of nutrients available and that will produce the highest quality product will compete well in the marketplace. In many cases it is also a matter of health and survival. Increased use of intensive farm production, often based on raising a single crop or breed, has led to increased susceptibility to disease and to pests. Resistant varieties must be developed to keep pace with increasingly intensive farm production practices.

This unit examines the application of biotechnology to large animal production. A variety of practices are considered, including those practices that are used in developing high quality stock and those that are aimed at enhancing the growth and development of existing breeds.

Objectives

Note: Objectives have been written in terms of an animal study but may be adapted to a plant study.

Concepts

Students will develop an understanding of each of the following concepts:

- breeds and varieties
- genetic characteristics
- principles of animal breeding
- artificial insemination and embryo transplants
- growth supplements and food additives
- hormones
- biotechnology.

Skills

Students will acquire skills in:

- observing animals (or pictures of animals) and interpreting their particular characteristics (e.g., size, shape, muscle development, fat cover)
- comparing strengths and weaknesses of different breeds
- identifying desirable characteristics
- identifying risks and benefits of using specialized breeds.

Attitudes

Students will develop the following attitudes:

- respect for animal welfare
- awareness of the role of research and biotechnology in agricultural industries
- awareness of the complex and multifaceted nature of large animal production
- awareness and appreciation of opportunities for careers in biotechnology and veterinary science
- awareness of potential effects of new technologies.

Example Topic: Animal Production Technology (Beef)

THEME 3: Resource Management: Land Use

Overview

This unit examines the scope and implications of land use practices. It considers land uses within urban areas as well as rural areas, and it examines the basis on which land use decisions are presently made. Key issues are identified and consideration is given to alternatives for the future.

A main theme of the unit is that decisions regarding land use play a large part in determining the nature and extent of agricultural production. What land will be used for agricultural purposes and what crops will be raised are questions that are continually under review. Currently, decisions that are made on land use are based largely on economic and practical considerations as seen by the land holder, but increasingly the decisions are becoming a matter of public concern. Both technical and societal considerations will play increasing roles in future land use planning.

Objectives

Concepts

Students will develop an understanding of each of the following concepts:

- agricultural land use considerations
  - quality of soil
  - topography
  - water and climate
  - market value of products
  - costs of operation
  - experience and livelihood of landholder
- available technology
- other land use considerations
  - urbanization and industrialization
  - resource extraction needs (mining and drilling operations)
  - public concerns regarding environmental quality
  - maintenance of natural environments
- historical change in land use
- sustained yield
- stewardship.

Skills

Students will acquire skills in:

- classifying land uses
- interpreting topographical features on maps and aerial photos
- analyzing land use within a given area
- identifying land use issues
- evaluating alternative land uses
- interpreting a farmstead plan
- drawing a rough site plan for a city lot
- setting goals for land use in an area.

Attitudes

Students will develop the following attitudes:

- awareness of long-term impacts of land uses
- appreciation of the diversity of values that come into play in land use decisions
- valuing both the need for agricultural land and the need for natural environments
- awareness and appreciation of opportunities for careers in land use planning
- conservation ethic.

REQUIRED/ELECTIVE COMPONENTS

Each unit of the program has a required component and an elective component, defined as follows:

The **required** component encompasses the knowledge, skills and attitudes that all students should be expected to acquire.

The **elective** component provides opportunities to adapt and enhance instruction to meet the diverse needs, abilities and interests of individual students. It provides enrichment and additional assistance to individual students as necessary.

The maximum time allotment for the elective component of the Junior High Agriculture: Land and Life Program shall be 30 percent of the instructional time.

D. LEARNING RESOURCES

BASIC LEARNING RESOURCES

No learning resources have been authorized as basic for the Junior High Agriculture: Land and Life Program.

RECOMMENDED AND SUPPLEMENTARY LEARNING RESOURCES

Recommended and supplementary learning resources are identified in the curriculum support documents.